

Tankless Water Heater

The need to cure water heater woes brought together Kennedy Space Center specialists with Space, Energy, Time Savings (SETS) Systems, Inc. of Miami, Florida.

SETS Systems had designed and developed an electronic "tankless" water heater. Although tankless water heaters have been in use in Europe and Asia for many years, these systems are not efficient enough to run an entire home.

SETS Systems merged computer chip technology with the water heater. By electronically controlling the heating of the water through heater elements, hot water is available when and where you want it—on demand. No more turn-the-knob battles with other water users in the house.

The SETS heater unit was built to efficiently serve the entire home even while several showers and faucets run simultaneously. The SETS tank is designed to render energy savings of up to 50-percent off hot water heating bills. Measuring a modest 12 x 11 x 2-inches and weighing 9-pounds, the unit is a space saver compared to the

common tank type water heaters. To remain competitively priced, the SETS Systems water heater was devised to keep manufacturing cost to a minimum, but retain high quality for the consumer.

But Carlos Cabrera, president of the company, had a puzzle on his hands. The flow switch on his tankless water heater design suffered intermittent problems. Hiring several testing and engineering firms produced only graphs, printouts, and a large expense, but not the hoped-for fix to the problem.

Cabrera then heard about the Kennedy Space Center (KSC)/State of Florida Technology Outreach Program. This NASA network, a part of the NASA Southeast Technology Transfer Alliance, runs throughout Florida to provide technical service to businesses at no cost. The program applies scientific and engineering expertise originally developed for space applications to the Florida business community.

Through a Technology Transfer Agreement (TTA), the KSC Technology Programs and Commercialization Office took on the water heat flow switch concern. Picking up the task was engineer Michael Brooks, a 21-year space program veteran. At KSC, Brooks has worked exclusively on the engineering support contract held by I-NET Inc., in support of KSC's Engineering Development Directorate.

Upon scrutiny of the SETS heater unit and flow switch design provided by Cabrera, Brooks discovered key problems with the switch. The solutions were modest, yet needed the keen eye of Brooks, backed by many years of working with flowmeters.

A prototype heater flow switch, incorporating the fixes, was built. Extensive testing of the new assembly worked flawlessly. Older heaters could be fixed simply by replacing two parts in the flow switch without removing the heater.

The heater itself underwent various tests. The new design turned out simpler, yielding a 63 percent reduction in labor and material costs over the old design.

The SETS Electronic Tankless Water Heater is being marketed throughout the United States and worldwide. Cabrera is hoping to expand the family-owned business beyond a \$1 million company. Exports throughout Latin America are one action item on a strategic marketing plan.

NASA's assist in solving SETS Systems water heater worries was immediately applauded by Cabrera. "The value they have brought to my company is immeasurable. If every other company in Florida knew about the benefits that this program offers, they'd be crazy not to do it," he says.



NASA personnel helped SETS Systems solve an engineering problem in its tankless water heater. The system heats water on demand instead of storing it in a tank, and is efficient enough to serve an entire home.



The flow switch developed with NASA expertise (top) solved the intermittent difficulties experienced with the previous designs (bottom). The new switch fits into older systems without other modifications.